Existing SWP/CVP Diversion Facilities

Preliminary Draft operational parameters for BDCP Option 1[1] – Below Normal Water Year

- **Option 1.** Existing pumping and associated facilities would be used, potentially including opportunistic water pumping and export during high flows (i.e., drawing water at times that have the least adverse affects for covered fish species). Restoration opportunities would be primarily in the northern and western Delta.

Parameter	Range		Rationale
Operational condition and seasonal time period used as a model input and/or output	*A range of values for a given operational condition intended to reflect alternative hypotheses or interpretations of available data*		*The rationales generally reflect the intended result of the parameter.*
Delta Salinity Standards	Manage to meet D-1641 agricultural and M&I water quality	Do not manage specifically to meet water quality standards – variable salinity	The range in salinity management has been chosen to reflect the two competing hypotheses regarding estuarine salinity management
Sacramento River at Rio Vista			
Sept-Oct	3,000 cfs	3,000cfs	Adult Chinook salmon attraction and migration flows – the range is based on Rio Vista flows from CALSIM for below normal and above normal water years
Nov-Dec	4,000 cfs	4,500 cfs	Juvenile salmon and steelhead migration/survival, pre-spawning migration by delta smelt, splittail, and others - the range is based on Rio Vista flows from CALSIM for below normal

[1] These operational parameters have been developed by the SAIC team, which is providing support to the BDCP Steering Committee. They are intended to enable the SAIC team to undertake a coarse modeling of the different conservation strategy options now undergoing a comparative evaluation to assist the Steering Committee in narrowing down the options for purposes of furthering the planning process. They are not designed to, nor intended to, represent proposed operational parameters for the system by either the SAIC team or any entity on the Steering Committee, nor should they be misconstrued as such.

			and above normal water years
Jan-Jun	5,000 cfs	9,000 cfs	Juvenile salmon and steelhead migration/survival, pre-spawning migration by delta smelt, splittail, and others - the range is based on Rio Vista flows from CALSIM for below normal and above normal water years
Jul-Aug	2,000 cfs	3,000 cfs	Steelhead and salmon rearing within the mainstem river; support resident fish habitat - the range is based on Rio Vista flows from CALSIM for below normal and above normal water years
San Joaquin River flow at Vernalis			
Apr-May	VAMP flow requirements	D-1641 flow requirements	The flow range was selected to reflect the current range of conditions intended to improve juvenile Chinook salmon emigration survival
Jun-Aug	D-1641 flow requirements	D-1641 flow requirements	Summer baseflows for resident fish, nutrient transport to Delta
Sep-Oct	D-1641 flow requirements	D-1641 flow requirements	Attraction flows and improved water quality (DO and temperature) for adult salmon migration
Nov-Mar	D-1641 flow requirements	D-1641 flow requirements	Salmon fry rearing and dispersal, nutrient transport to Delta, splittail spawning and larval rearing and dispersal
X_2			
Feb-June	D-1641 X_2 locations	66 km (mean) 63-69 km (range)	The range of X_2 locations during the late winter-spring is intended to (1) reflect the current regulatory requirements, and (2) an expansion of low-salinity habitat further downstream within Suisun Bay
Jul-Jan	Model output	Model output	Evaluation parameter
Total Delta Outflow	Model output	Model output	Evaluation parameter
Hydraulic Residence Time in Selected	Model output	Model output	Evaluation parameter

Delta Channels			
DCC			
Feb-Jun	Closed	Open	The range in DCC operations was intended to reflect (1) reduced movement of juvenile salmon and steelhead into the interior Delta; improved juvenile salmon survival, and (2), improved hydrodynamics for delta smelt within the central Delta and reduced vulnerability to SWP/CVP diversions
Jul-Jan	Open	Open	Improve hydrodynamics and water quality within the central Delta; reduce the potential barrier to fish movement into and out of the central delta
HORB			
Mar-May	Closed	Open	The range in HORB operations was intended to reflect two alternative hypotheses that include (1) reduced movement of juvenile salmon and steelhead into the southern Delta; improved salmonid survival and reduced vulnerability to SWP/CVP diversions, and (2) improved hydrodynamics for delta smelt and reduced vulnerability to SWP/CVP diversions
Jun-Aug	Open	Open	Increase flows and flushing within the southern Delta to improve water quality
Sep-Nov	Closed	Open	The range of HORB gate operations was intended to reflect two alternative hypotheses that include (1) improved attraction flows and water quality for adult salmon within the lower San Joaquin River, and (2) improved hydrodynamics for delta smelt and reduced vulnerability to SWP/CVP diversions
Dec-Feb	Closed	Open	The range of HORB gate operations was intended to reflect two alternative hypotheses that include (1) reduced movement of salmon fry into the southern Delta; improved salmonid survival and

			reduced vulnerability to SWP/CVP diversions, and (2) improved hydrodynamics for delta smelt and reduced vulnerability to SWP/CVP diversions
Old and Middle River Flows (Combined)			
Mar-May	<-5,000 cfs	<-1,000 cfs	The range of reverse flows are intended to reflect two alternative hypotheses that include (1) reverse flows that have been hypothesized to reduce the movement of juvenile salmon and steelhead, delta smelt, longfin smelt, and splittail into Old and Middle River, improve survival; and (2) maintain a net westerly flow thought to benefit juvenile salmon migration rate and survival; reduce the vulnerability of planktonic fish eggs and larvae to diversion effects; non-SWP/CVP diversions contribute to reverse flows in Old and Middle River of approximately 1,000 cfs
Jun	<-5,000 cfs	<-4,000 cfs	The range in reverse flows are intended to reflect (1) fewer larval delta smelt and other fish are present in the central and southern Delta in June and juvenile salmon have largely completed their emigration through the Delta by June, and (2) reduced movement of juvenile salmon and steelhead, delta smelt, longfin smelt, and splittail into Old and Middle River and thereby improve survival and reduce SWP/CVP salvage
Jun-Sep	No criterion	<-5,000 cfs	The range of values are intended to reflect alternative hypotheses regarding the effects of increased diversions and reverse flows during the summer on Delta habitat and vulnerability of delta smelt and other fish to SWP/CVP salvage; reduce vulnerability of resident fish to salvage; reduce entrainment of nutrients
Oct-Nov	No criterion	<-1,000 cfs	The range of values are intended to reflect

			alternative hypotheses regarding the effects of increased diversions and reverse flows during the fall on Delta habitat and vulnerability of delta smelt and other fish to SWP/CVP salvage; non-SWP/CVP diversions contribute to reverse flows in Old and Middle River of approximately 1,000 cfs; a larger reduction in reverse flows is expected to contribute to a greater fall attraction flow for adult salmon returning to the San Joaquin River
Dec-Feb	No criterion – see QWEST	<-1,000 cfs	The range of winter reverse flows is intended to reflect two alternative hypotheses that include (1) results of analyses by Pete Smith and Sheila Green that show an increase in delta smelt salvage as reversed flows increase, with a rapid increase in salvage as reverse flows exceed approximately 5,000 to 6,000 cfs, and (2) analyses show that delta smelt salvage increases as reverse flows increase and therefore a reduction in the magnitude of reverse flows is expected to contribute to a reduction in delta smelt losses; non-SWP/CVP diversions contribute to reverse flows in Old and Middle River of approximately 1,000 cfs; a larger reduction in reverse flows is intended to contribute to a greater reduction in salmon fry and steelhead salvage and a lower vulnerability of pre-spawning delta and longfin smelt to SWP/CVP salvage; a greater reduction in reverse flows is expected to result in a greater reduction in nutrient diversions from the Delta and San Joaquin River
QWEST			
Mar-May	No criterion	Net positive flows (no reverse flow)	The range in QWEST during the spring is intended to reflect two alternative hypotheses including (1) no data or analyses have been developed to demonstrate a relationship between the magnitude of QWEST and adverse

			impacts to delta smelt, salmon, or other fish species; and (2) net positive flows are expected to reduce movement of juvenile salmon, steelhead, larval and juvenile delta and longfin smelt, juvenile splittail, and other fish from the Sacramento River into the Delta; increase transport of plankton fish eggs, larvae, and juveniles downstream into Suisun Bay; increase the transport of zooplankton and nutrients downstream into Suisun Bay; reduce the vulnerability of fish to SWP/CVP salvage; reduce potential delays in downstream migration of juvenile salmon and other fish
Jun	No criterion	Limit QWEST to <-2,000 cfs	The range in QWEST during June is intended to reflect two alternative hypotheses including (1) no data or analyses have been developed to demonstrate a relationship between the magnitude of QWEST and adverse impacts to delta smelt, salmon, or other fish species; evaluation criterion, and (2) densities of juvenile fish potentially affected by QWEST are reduced in the central Delta by June and therefore the potential benefit is reduced; reduce movement of juvenile salmon, steelhead, larval and juvenile delta and longfin smelt, juvenile splittail, and other fish from the Sacramento River into the Delta; increase transport of plankton fish eggs, larvae, and juveniles downstream into Suisun Bay; increase the transport of zooplankton and nutrients downstream into Suisun Bay; reduce the vulnerability of fish to SWP/CVP salvage; reduce potential delays in downstream migration of juvenile salmon and other fish
Jul-Nov	No criterion	Net positive flows (no reverse flow)	The range of QWEST values is intended to reflect two alternative hypotheses including (1) delta smelt and other fish have reached a size where swimming performance allows volitional habitat selection; many fish are located

			downstream in Suisun Bay and are not in the area affected by QWEST, and (2) reduce the movement of adult delta smelt from the Sacramento River into the interior Delta and thereby reduce their vulnerability to SWP/CVP diversions
Dec-Feb	Net positive flows (no reverse flow)	Net positive flows (no reverse flow)	Reduce the movement of adult delta smelt from the Sacramento River into the interior Delta and thereby reduce their vulnerability to SWP/CVP diversions
SWP/CVP VAMP Operations			
April	Model output	VAMP	The range of SWP/CVP diversions is intended to reflect two alternative hypotheses that include (1) opportunistic diversions used as a model evaluation parameter, and (2) start of the peak period of San Joaquin juvenile salmon emigration through the Delta; larval stages of delta smelt, longfin smelt, splittail, and other fish are present in the Delta in relatively high densities and are vulnerable to diversion losses; VAMP diversion rates are intended to provide a higher level of protection from diversion related direct and indirect effects; extend the VAMP period to two months to increase the seasonal period of potential protection
May	VAMP	VAMP	Evaluation parameter; intended to provide increased protection for juvenile salmon emigrating from the San Joaquin, Mokelumne, Cosumnes, and other Central Valley rivers and other species; peak period of smolt migration occurs in May in many years; assumes for modeling that VAMP period is in May however the actual period may vary

Assumptions:

•Water conveyance and south of Delta storage are assumed to not limit pumping operations– model evaluation parameter.

•Upstream reservoir storage and releases will be made in accordance with current requirements to support salmon and steelhead habitat and maintain suitable water temperatures and compliance with existing agreements and regulatory requirements including FERC conditions and ESA requirements.